

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on) \text{ max}}$              | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|---------------------------------------|------------------------------------|
| 30V           | 29m $\Omega$ @ $V_{GS} = 10\text{V}$  | 5.6A                               |
|               | 35m $\Omega$ @ $V_{GS} = 4.5\text{V}$ | 4.8A                               |

## Description

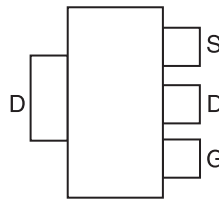
This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

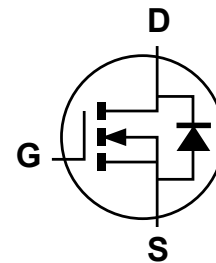
- DC Motor Control
- DC-AC Inverters



Top View



Pin Out - Top View



Equivalent Circuit

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

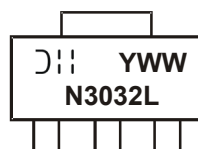
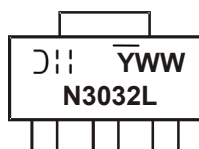
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.112 grams (approximate)

## Ordering Information (Note 4)

| Part Number  | Qualification | Case   | Packaging           |
|--------------|---------------|--------|---------------------|
| DMN3032LE-13 | Standard      | SOT223 | 2,500 / Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



$\text{D}\text{I}\text{S}$  = Manufacturer's Marking

N3032L = Marking Code

YWW = Date Code Marking for SAT (Shanghai Assembly/ Test site)

YWW = Date Code Marking for CAT (Chengdu Assembly/ Test site)

Y or Y = Year (ex: 3 = 2013)

WW = Week (01 - 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic  | Symbol           | Value                  | Units |
|---|------------------|------------------------|-------|
| Drain-Source Voltage                                    | V <sub>DSS</sub> | 30                     | V     |
| Gate-Source Voltage                                     | V <sub>GSS</sub> | ±20                    | V     |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V | I <sub>D</sub>   | T <sub>A</sub> = +25°C | 5.6   |
|   |                  | T <sub>A</sub> = +70°C | 4.1   |
|   | I <sub>D</sub>   | T <sub>C</sub> = +25°C | 15.4  |
|   |                  | T <sub>C</sub> = +70°C | 12.1  |
| Maximum Continuous Body Diode Forward Current (Note 5)  | I <sub>S</sub>   | 1.5                    | A     |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%)      | I <sub>DM</sub>  | 25                     | A     |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                   | Symbol                            | Value                  | Units |
|--|-----------------------------------|------------------------|-------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | T <sub>A</sub> = +25°C | 1.8   |
|  |                                   | T <sub>A</sub> = +70°C | 1.1   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 69                     | °C/W  |
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 14                     | W     |
| Thermal Resistance, Junction to Case (Note 5)    | R <sub>θJC</sub>                  | 8.7                    | °C/W  |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150            | °C    |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                          | Symbol              | Min | Typ  | Max  | Unit | Test Condition  |
|---|---------------------|-----|------|------|------|---|
| <b>OFF CHARACTERISTICS (Note 6)</b>     |                     |     |      |      |      |   |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 30  | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA  |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —    | 1    | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                     | I <sub>GSS</sub>    | —   | —    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 6)</b>      |                     |     |      |      |      |   |
| Gate Threshold Voltage                  | V <sub>GS(th)</sub> | 1   | —    | 2    | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                  |
| Static Drain-Source On-Resistance       | R <sub>DS(on)</sub> | —   | 22   | 29   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.2A  |
|   |                     | —   | 27   | 35   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.8A   |
| Forward Transfer Admittance             | Y <sub>fs</sub>     | —   | 7    | —    | S    | V <sub>DS</sub> = 5V, I <sub>D</sub> = 5.8A   |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.7  | 1.5  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A   |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b> |                     |     |      |      |      |   |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 498  | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V<br>f = 1MHz                                     |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 52   | —    |      |   |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 45   | —    |      |   |
| Gate Resistnace                         | R <sub>g</sub>      | —   | 2.2  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz  |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 11.3 | —    | nC   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.8A                         |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 1.4  | —    |      |   |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 2.1  | —    |      |   |
| Turn-On Delay Time                      | t <sub>D(on)</sub>  | —   | 2.3  | —    | ns   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>L</sub> = 2.6Ω, R <sub>G</sub> = 3Ω |
| Turn-On Rise Time                       | t <sub>r</sub>      | —   | 3.9  | —    |      |   |
| Turn-Off Delay Time                     | t <sub>D(off)</sub> | —   | 10   | —    |      |   |
| Turn-Off Fall Time                      | t <sub>f</sub>      | —   | 1.9  | —    |      |   |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

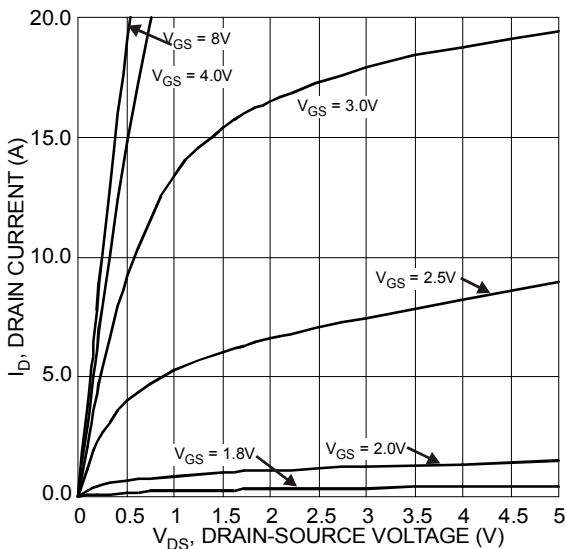


Figure 1 Typical Output Characteristic

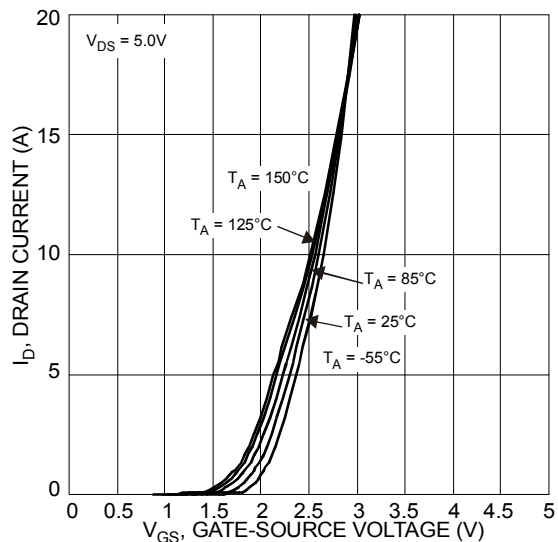


Figure 2 Typical Transfer Characteristics

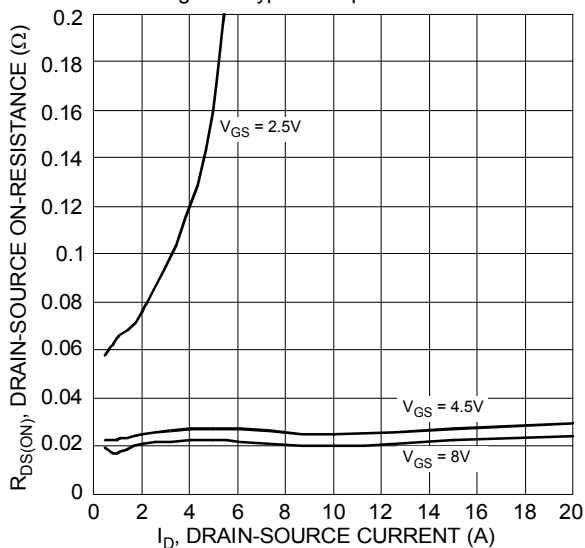


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

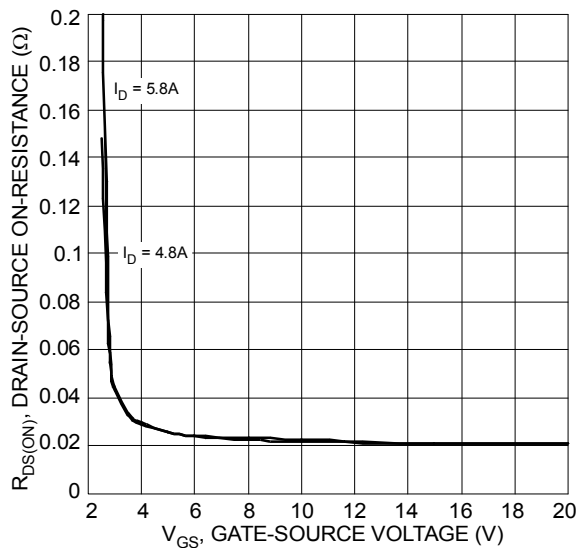


Figure 4 Typical Transfer Characteristic

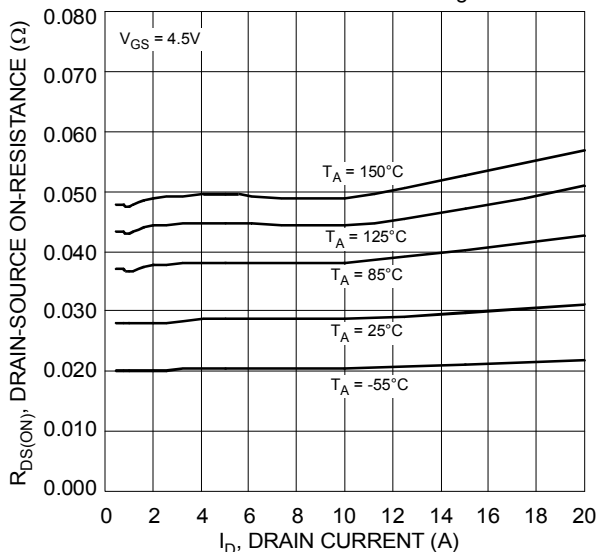


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

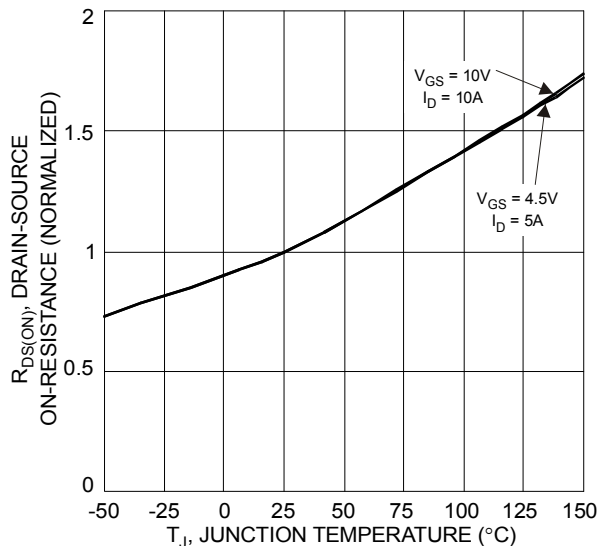


Figure 6 On-Resistance Variation with Temperature

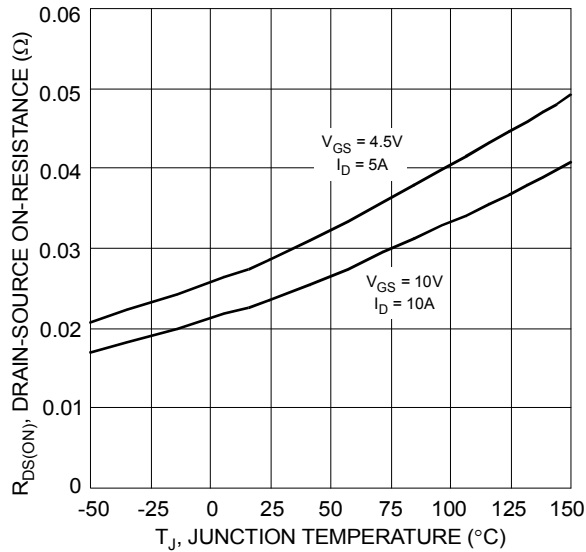


Figure 7 On-Resistance Variation with Temperature

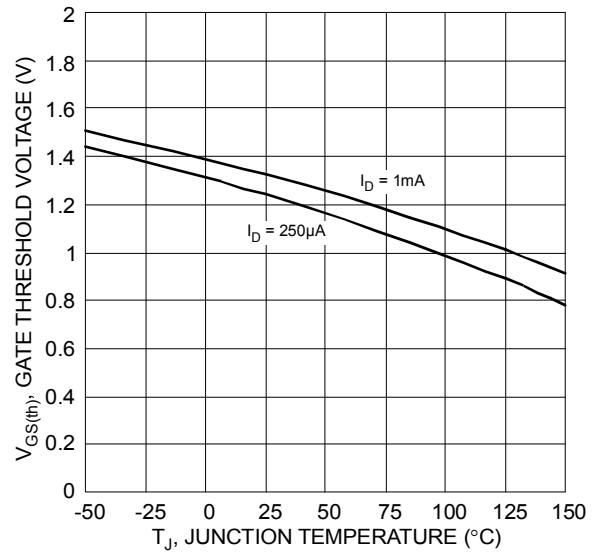


Figure 8 Gate Threshold Variation vs. Ambient Temperature

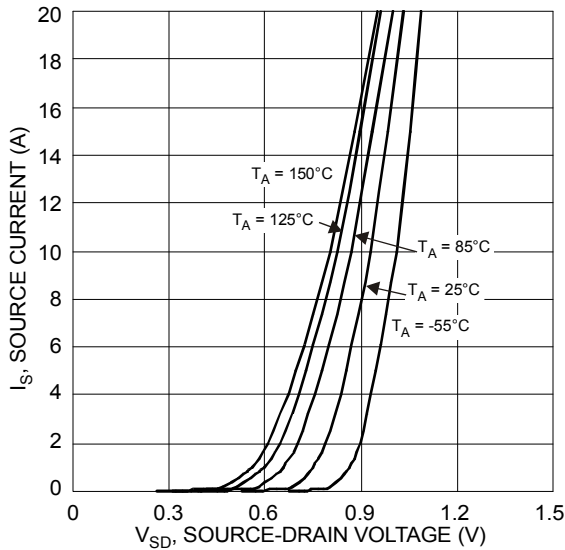


Figure 9 Diode Forward Voltage vs. Current

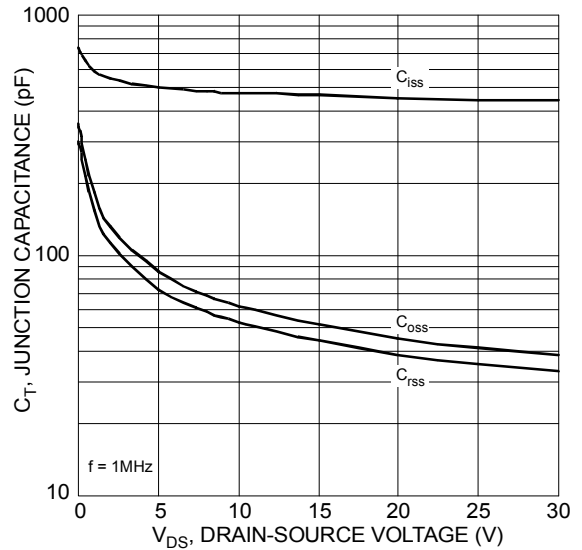


Figure 10 Typical Junction Capacitance

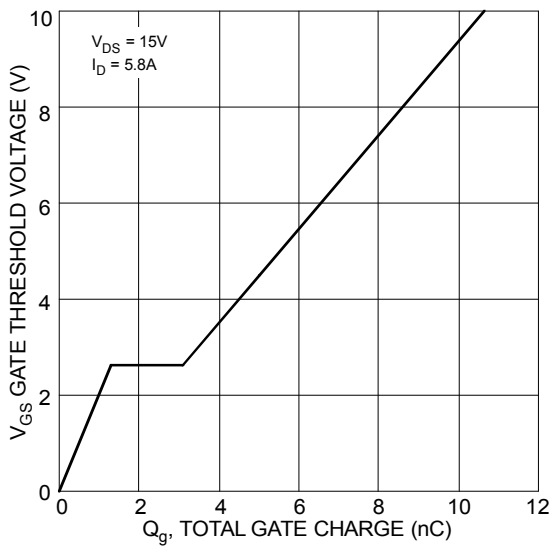
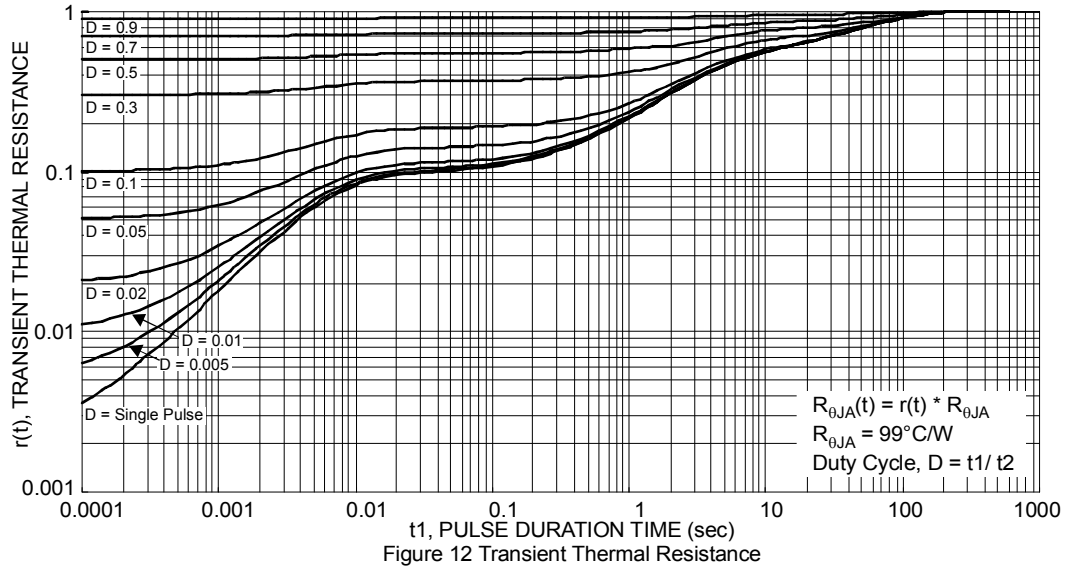
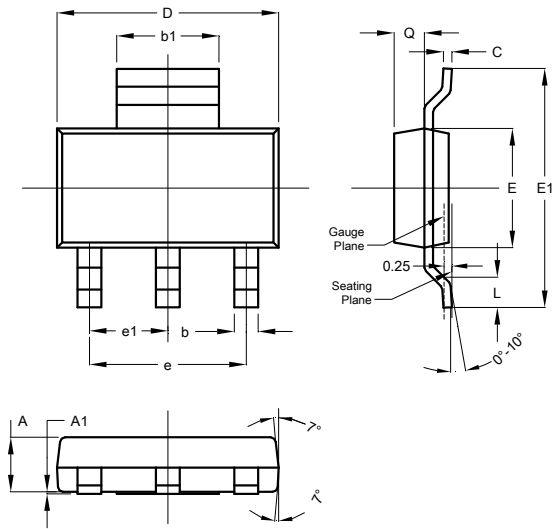


Figure 11 Gate Charge



**Package Outline Dimensions**

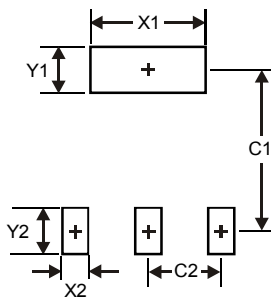
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT223               |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 1.55  | 1.65 | 1.60 |
| A1                   | 0.010 | 0.15 | 0.05 |
| b                    | 0.60  | 0.80 | 0.70 |
| b1                   | 2.90  | 3.10 | 3.00 |
| C                    | 0.20  | 0.30 | 0.25 |
| D                    | 6.45  | 6.55 | 6.50 |
| E                    | 3.45  | 3.55 | 3.50 |
| E1                   | 6.90  | 7.10 | 7.00 |
| e                    | -     | -    | 4.60 |
| e1                   | -     | -    | 2.30 |
| L                    | 0.85  | 1.05 | 0.95 |
| Q                    | 0.84  | 0.94 | 0.89 |
| All Dimensions in mm |       |      |      |

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| X1         | 3.3           |
| X2         | 1.2           |
| Y1         | 1.6           |
| Y2         | 1.6           |
| C1         | 6.4           |
| C2         | 2.3           |

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